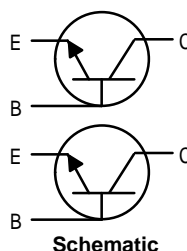


Preliminary Data Sheet
Plastic Power Transistors

SO-8 for Surface Mount Applications

Designed for general purpose amplifier and low speed switching applications.

- Collector–Emitter Sustaining Voltage — $V_{CE(sus)}$
= 30 Vdc (Min) @ $I_C = 10$ mA
- High DC Current Gain — h_{FE}
= 100 Vdc (Min) @ $I_C = 1.0$ Adc
= 90 Vdc (Min) @ $I_C = 3.0$ Adc
- Low Collector–Emitter Saturation Voltage — $V_{CE(sat)}$
= 0.235 Vdc (Max) @ $I_C = 1.2$ Adc
= 0.5 Vdc (Max) @ $I_C = 5.0$ Adc
- Miniature SO-8 Surface Mount Package – Saves Board Space



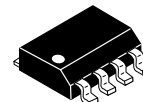
Schematic

MARKING: 3N3BJT ENG

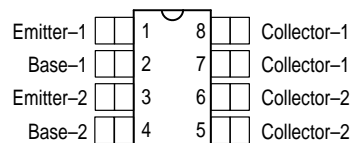
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Motorola Preferred Device

**DUAL BIPOLAR
POWER TRANSISTOR
NPN SILICON
30 VOLTS
3 AMPERES**



**CASE 751-05, Style 16
(SO-8)**



Top View
Pinout

MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Base Voltage	V_{CB}	45	Vdc
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Emitter–Base Voltage	V_{EB}	± 8.0	Vdc
Collector Current — Continuous — Peak	I_C	3.0 5.0	A
Base Current — Continuous	I_B	1.0	A
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to $+150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance – Junction to Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ ⁽¹⁾ Derate above 25°C	P_D	2.0 16	Watts $\text{mW}/^\circ\text{C}$
Maximum Temperature for Soldering	T_L	260	$^\circ\text{C}$

(1) Mounted on 2" sq. FR-4 board (1" sq. 2 oz. Cu 0.06" thick single sided) with one die operating, 10 seconds max.

This document contains information on a new product. Specifications and information are subject to change without notice.

Preferred devices are Motorola recommended choices for future use and best overall value.

MMDJ3N03BJT

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (I _C = 10 mA _{dc} , I _B = 0 A _{dc}) Temperature Coefficient (Positive)	V _{CEO(sus)}	—	—	30 tbd	V _{dc} V/°C
Collector Cutoff Current (V _{CE} = 25 V _{dc})	I _{CEO}	—	—	50	μA _{dc}
Emitter Cutoff Current (V _{BE} = 5.0 V _{dc} , I _C = 0 A _{dc})	I _{EBO}	—	—	1.0	mA _{dc}

ON CHARACTERISTICS(1)

Collector–Emitter Saturation Voltage (I _C = 1.2 A _{dc} , I _B = 20 mA _{dc}) (I _C = 5.0 A _{dc} , I _B = 1.0 A _{dc})	V _{CE(sat)}	—	0.130 —	0.235 0.500	V _{dc}
Base–Emitter Saturation Voltage (I _C = 5.0 A _{dc} , I _B = 1.0 A _{dc})	V _{BE(sat)}	—	—	—	V _{dc}
Base–Emitter On Voltage (I _C = 2.0 A _{dc} , V _{CE} = 1.0 V _{dc})	V _{BE(on)}	—	—	1.0	V _{dc}
DC Current Gain (I _C = 1.0 A _{dc} , V _{CE} = 4.0 V _{dc}) (I _C = 3.0 A _{dc} , V _{CE} = 4.0 V _{dc})	h _{FE}	100 90	180 165	— —	—

DYNAMIC CHARACTERISTICS

Output Capacitance (V _{CB} = 10 V _{dc} , f = 1.0 MHz)	C _{ob}	—	80	135	pF
Input Capacitance (V _{EB} = 8.0 V _{dc} , f = 1.0 MHz)	C _{ibo}	—	200	250	pF
Current–Gain — Bandwidth Product(2)	f _T	tbd	—	—	MHz

SWITCHING CHARACTERISTICS(1)

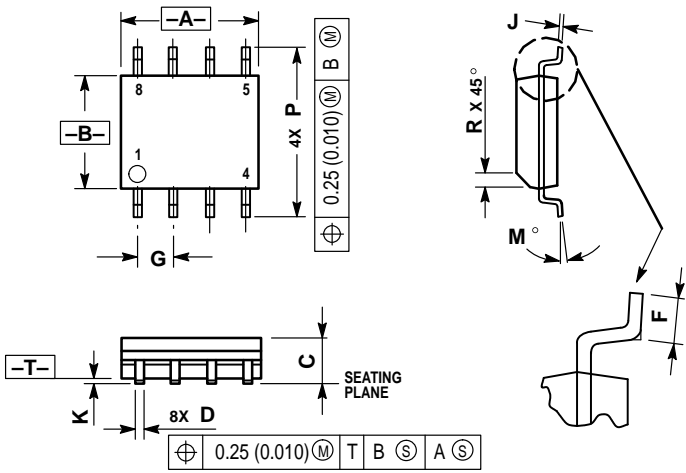
Resistive Load

Delay Time	(I _C = 2.0 A _{dc} , I _{B1} = I _{B2} = 30 mA _{dc} , V _{CC} = 10 V _{dc})	t _d	—	215	—	ns
Rise Time		t _r	—	100	—	ns
Storage Time		t _s	—	530	—	ns
Fall Time		t _f	—	60	—	ns

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

(2) f_T = |h_{FE}| • f_{test}

PACKAGE DIMENSIONS




- NOTES:
1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
 2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 3. DIMENSIONS ARE IN MILLIMETER.
 4. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
 5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
 6. DIMENSION D DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	4.80	5.00
B	3.80	4.00
C	1.35	1.75
D	0.35	0.49
F	0.40	1.25
G	1.27 BSC	
J	0.18	0.25
K	0.10	0.25
M	0°	7°
P	5.80	6.20
R	0.25	0.50

- STYLE 16:
- PIN 1. EMITTER, DIE #1
 - BASE, DIE #1
 - EMITTER, DIE #2
 - BASE, DIE #2
 - COLLECTOR, DIE #2
 - COLLECTOR, DIE #2
 - COLLECTOR, DIE #1
 - COLLECTOR, DIE #1

CASE 751-05
ISSUE P

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